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TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

June 5, 2013

The Honorable Jack Brockhouse
Mayor of City of Ivanhoe
880 Charmaine Drive East, Suite A
Woodville, Texas 75979-7298

**Subject: LaChausse Dam – Inventory Number TX03755
Tyler County, Texas**

Dear Mayor Brockhouse,

LaChausse Dam, a small-size earthen dam located in Tyler County, was inspected by Texas Commission on Environmental Quality (TCEQ) Dam Safety Section staff on July 18, 2012, as a routine dam safety inspection. The dam is owned and maintained by the City of Ivanhoe. The inspection found that the subject dam was in overall poor condition due to the presence of sand boils and accumulated sand along the toe of the embankment and a large open joint between the dam crest and upstream slope. Several additional issues of concern were noted during the inspection including joints with deteriorated sealant on the dam crest; cracks and joints with deteriorated sealant and vegetation on the dam's upstream slope, downstream slope, and principal spillway; clogged weep holes; seepage from joints on the downstream slope; seepage from the area immediately below the low-flow system's outlet pipe; and the lack of a finalized Emergency Action Plan.

Please note that LaChausse Dam's hazard classification has been revised – additional information regarding this issue is contained in the "Confidential: Downstream Hazards" section of the attached inspection report.

Please review the attached report and provide a **written response to this letter by August 5, 2013**. The response should include your plan and a schedule for addressing each of the items noted in the report. The method and time frame for addressing the items in the report are left up to the owner, and it is recognized that finances may govern the work that can be undertaken.

TCEQ appreciates your assistance. If you have any questions or would like to discuss any of this in further detail, please feel free to contact me at (512) 239-2516 or Warren Samuelson, P.E., at (512) 239-5195.

LaChausse Dam - TX03755

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Sincerely,

A handwritten signature in black ink, appearing to read "John Forehand", with a long, sweeping horizontal stroke extending to the right.

John Forehand, P.G.
Geologist, Dam Safety Section
Critical Infrastructure Division, MC-177

Attachment: LaChausse Dam Inspection Report



DAM SAFETY SECTION

CRITICAL INFRASTRUCTURE DIVISION

Dam Safety Inspection Report

LaChausse Dam – TX03755

GENERAL INFORMATION

DAM: LaChausse Dam (formerly Lake Charmaine Dam)

INVENTORY NO.: TX03755

OWNER: City of Ivanhoe

STREAM: Mangus Branch BASIN: Neches River

LOCATION: 6 Miles South of Woodville COUNTY: Tyler

DOWNSTREAM HAZARD CLASSIFICATION: See Inspection Report

DAM HEIGHT: 24 feet (ft) SIZE: Small

NORMAL CAPACITY: 608 acre-feet (ac-ft)

MAXIMUM CAPACITY: 700 ac-ft

INSPECTION DATE: July 18, 2012

PREVIOUS INSPECTION DATE: November 7, 2007

INSPECTION TEAM: Warren Samuelson, P.E., and John Forehand, P.G.

PERSONNEL CONTACTED: Mr. Rusty Harrison, Dam Supervisor and Mr. Leon Todd, Site Representative

SUMMARY

LaChausse Dam, a small-size earthen dam located in Tyler County, was inspected by Texas Commission on Environmental Quality (TCEQ) Dam Safety Section staff on July 18, 2012, as a routine dam safety inspection. The dam is owned and maintained by the City of Ivanhoe. The inspection found that the subject dam was in overall poor condition due to the presence of sand boils and accumulated sand along the toe of the embankment and a large open joint between the dam crest and upstream slope. Several additional issues of concern were noted during the inspection including joints with deteriorated sealant on the dam crest; cracks and joints with deteriorated sealant and vegetation on

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- The interface between the upstream slope pavement and the dam crest needed to be repaired;
- All joints and cracks in the dam should be cleaned and resealed;
- The weep holes should be cleaned;
- Exposed reinforcing wire in the upstream slope concrete should be evaluated by the owner's engineer;
- A maintenance and inspection program should be initiated; and
- Guardrail posts on the bridge needed to be repaired and damaged sections of guardrail repaired and reconnected.

The most recent previous inspection, conducted on November 7, 2007, indicated that the dam was in poor condition. Recommendations included in the inspection report included the following:

- A boring program should be undertaken to determine if soils are being washed from beneath the embankment's concrete cap (as occurred in 2004); the extent of any undermining needs to be determined; and undermined areas should be repaired;
- The interface between the upstream slope and dam crest needs to be repaired. All cracks and joints in the dam should be cleaned and resealed;
- The weep holes should be cleaned;
- The exposed reinforcing steel in the upstream slope concrete should be evaluated by the owner's engineer to determine what should be done;
- A maintenance and inspection program should be initiated;
- Spalled and cracked concrete on the bridge's guard rail posts should be repaired;
- The damaged sections of the principal spillway's trash guard should be repaired; and
- The owner should continue efforts to keep vehicular traffic off the slopes of the dam.

Many of the issues of concern and recommendations contained in the April 20, 2004, and November 7, 2007, inspection reports have not been addressed by the owner and are also included in this inspection report.

An election on November 3, 2009, incorporated the Ivanhoe North and Ivanhoe communities into the City of Ivanhoe. As a result of the incorporation, ownership of the subject dam was transferred from the Ivanhoe Property Owner's Improvement Association, Inc. to the City of Ivanhoe.

INSPECTION FINDINGS

Figure 1 is a General Location Map. Figure 2 is an aerial photo of the dam and surrounding area. Figure 3 is an aerial photo of the dam. Figure 4 is a close-up aerial photo of the Principal Spillway. Photo 5 is a dam sketch and photo key. Please note that the right and left indications contained in this report are from the perspective of an observer looking downstream. During the current inspection, the impoundment water level was approximately one inch above the principal spillway crest at an estimated elevation of 163.08 ft-msl – approximately 1.92 feet below the dam/emergency spillway crest.

DAM CREST/EMERGENCY SPILLWAY

- The approximately 1,200-foot long by 24-foot wide concrete capped crest was in fair condition.
- The entire dam/emergency spillway crest is designed to be overtopped during flood conditions.
- Approximately 900 feet of the concrete capped dam crest is at an elevation of 165 feet-msl. This section of the dam crest serves as the emergency spillway's effective crest.
- The crest was relatively level and consistent in alignment. (Photo 1)
- The crest carries a two-lane concrete roadway named Camelot Drive. (Photo 1)
- The elastic sealant in some portions of the joints between concrete panels was deteriorated. (Photos 1 and 2)

- Some of the joints between the concrete panels on the downstream slope had deteriorated or were missing sealant. Seepage was flowing from some of the joint sections located within 3 feet of the downstream toe of the embankment. Iron staining, sand, and grassy vegetation were present in the seepage areas. The presence of sand in these areas suggests that sediment is being eroded from the embankment. Continued erosion of the embankment could eventually result in failure of the embankment and loss of the impoundment. (Photos 14, 15, 17, 19, and 20)
- Longitudinally oriented cracks were present on the lower portion of the slope. (Photos 14, 19, and 20)
- Metal utility poles were present on the upper portion of the downstream slope. The poles were vertical and showed no signs of downstream slope movement. (Photos 1 and 15)

PRINCIPAL SPILLWAY

- The principal spillway is located approximately 150 feet southeast of the left end of the dam and was in fair condition.
- The spillway essentially consists of an approximately 160-foot wide by 2-foot deep concrete box culvert with a concrete lined discharge area on the embankment's 3H:1V downstream slope. A 20-foot wide by 1-foot deep stilling basin is present along the downstream toe of the embankment slope.
- The top of the spillway's box culverts supports a two lane concrete roadway (Camelot Drive) with metal guardrails and posts. The concrete at the base of some of the guardrail posts was cracked and spalled. (Photos 22 and 27)
- An area of cracked and spalled concrete was present on spillway's right sidewall. (Photo 26)
- Metal bar trash grates extend across the upstream side of the spillway. The grates were in good condition and no debris was present on the grates. (Photo 22)
- Some of the joints between the concrete panels on the downstream portion of the spillway had deteriorated or missing sealant. Grassy vegetation was growing in some of the joints. (Photos 23, 24, and 25)
- A possible sand boil was present immediately downstream of the toe of the spillway. (Photo 28)
- Several areas of sand accumulation were present along the toe of the spillway embankment. Owner representatives stated that they routinely remove sediment that has accumulated in the stilling basin.

LOW FLOW OUTLET SYSTEM

- The low flow outlet system consists of a 24-inch diameter steel pipe with a valve located near the left end of the dam. The low-flow outlet's valve control wheel was chained and padlocked. The low-flow outlet system appeared to be in fair condition. (Photo 30)
- Seepage and a minor amount of grassy vegetation were present at the downstream end of the low flow outlet's discharge pipe. (Photo 30)

CONFIDENTIAL: DOWNSTREAM HAZARDS

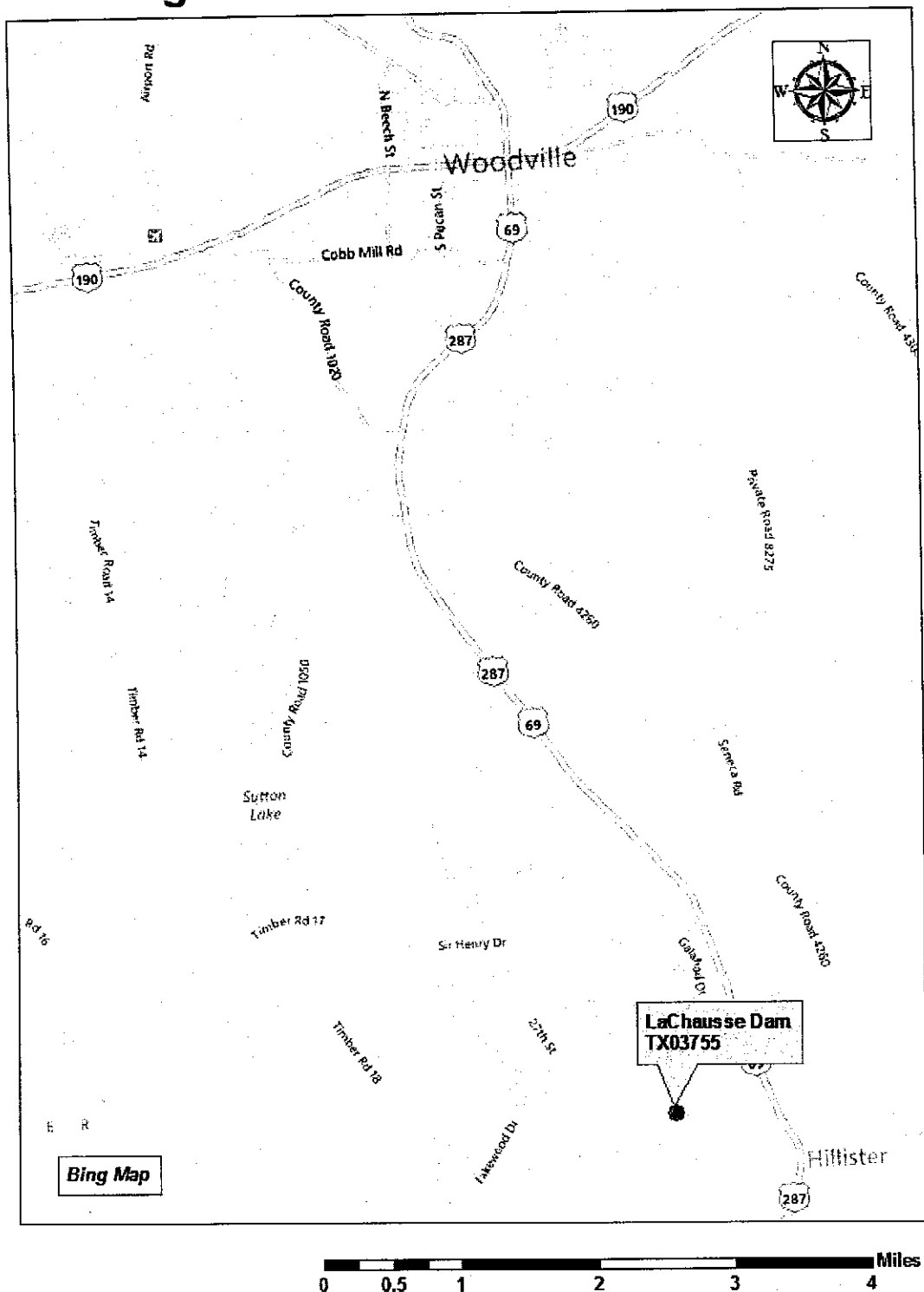
TCEQ Dam Safety Section staff performed a downstream hazard assessment for the subject dam. The assessment included a limited downstream investigation during the current inspection; review of current (2009) aerial photographs following the current inspection; and performing a Simplified Breach Analysis following the previous (July 18, 2012) inspection. The assessment determined that a breach or failure of the subject dam could adversely impact the roadway crossing the dam (Camelot Drive), County Road 1205, US Highway 69, and a minimum of four buildings. The assessment also revealed that only three of the buildings were houses and that the houses appeared to be at the same elevation as the top of the dam so would not likely be impacted by a dam breach or failure. Owner representatives stated that an individual has been attempting to obtain the necessary permits to develop a camp downstream of the dam. Criteria stated in 30 Texas Administrative Code (TAC), Chapter 299, Section (§) 299.14((3)(A) (relating to Hazard Classification Criteria) indicates that if a

drain system; bentonite slurry or clay cut-off wall; dewatering wells; or a combination of engineering controls. Any engineering plans to address this issue must be approved by TCEQ Dam Safety Section staff prior to initiating the repairs and be implemented under the supervision of a Texas licensed professional engineer.

3. As recommended in the 2004 and 2007 inspection reports, the interface between the upstream slope pavement and the dam crest needs to be repaired. A Texas licensed professional engineer should inspect the interface and develop plans for repair. Any plans for repair of this area must be approved by TCEQ Dam Safety Section staff prior to initiating the repairs and be implemented under the supervision of your Texas licensed professional engineer.
4. As recommended in the 2004 and 2007 inspection reports, all joints and cracks in the embankment's concrete cap should be cleaned and resealed with an appropriate elastic sealant.
5. All joints and cracks in the principal spillway's concrete cap should be cleaned and resealed with an appropriate elastic sealant.
6. As recommended in the 2004 and 2007 inspection reports, weep holes should be cleared of sediment and vegetation.
7. As recommended in the 2004 and 2007 inspection reports, spalling and cracks in the concrete at the base of guard rail posts should be repaired.
8. As noted in the 2004 and 2007 inspection reports, a Texas licensed professional engineer should evaluate and develop plans for repair of the cracked and spalled concrete in the principal spillway's right sidewall.
9. The excessive vegetation and small trees growing adjacent to the concrete slab on the right end of the stilling basin should be removed and an appropriate short grass cover established over the repaired area.
10. The owner should periodically remove sediment that has accumulated in the stilling basin so that the area can be monitored for changes regarding existing/future seeps, boils, or other evidence of piping and erosion. If possible, items such as the sediment removal dates; location and size of sediment deposits and individual sand boils; estimated volume and type of sediment removed (i.e., sand, silt, clay, etc.); the location and approximate seepage rate of individual seeps; and any other relevant information should be included in the owner's routine maintenance and inspection reports.
11. A finalized EAP should be submitted for LaChausse Dam.
12. The owner should continue implementing the maintenance, inspection, and reporting program that has been established for LaChausse Dam.

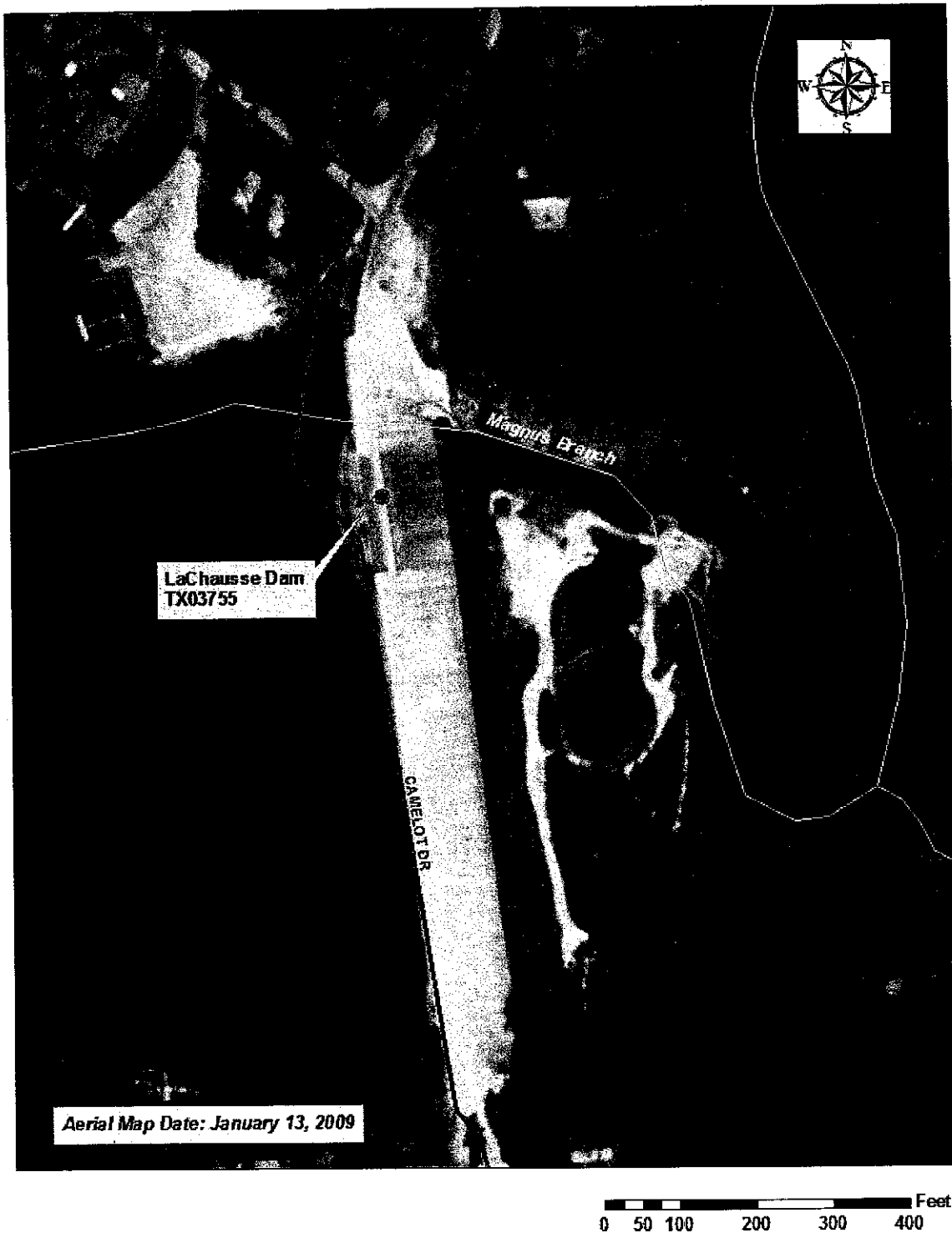
LaChausse Dam - TX03755

Figure 1 - General Location Map

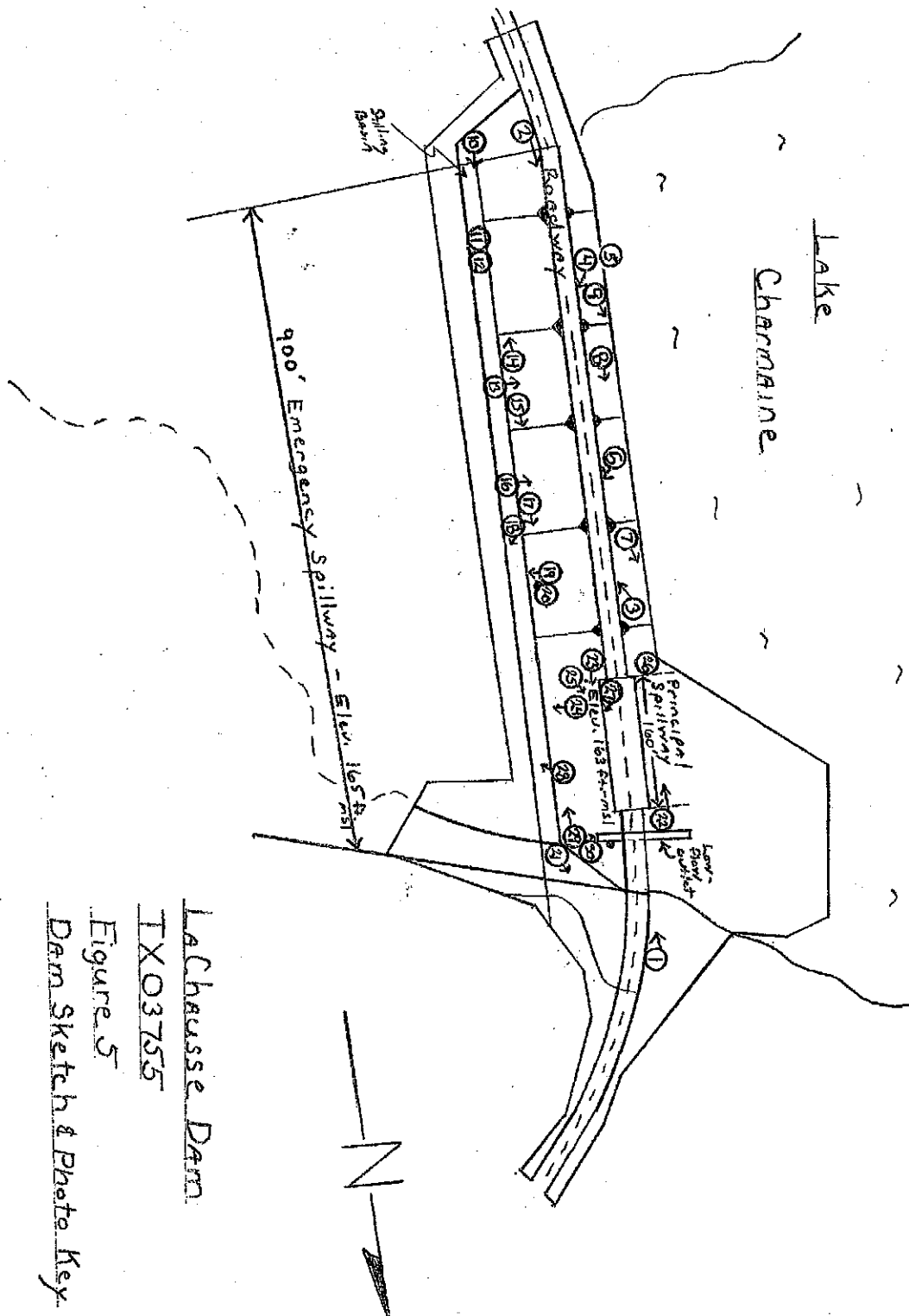


LaChausse Dam - TX03755

Figure 3 - Aerial Photo of Dam



⊗ Photo No. & Direction



LaChausse Dam
TX03755
Figure 5
Dam Sketch & Photo Key

Not To Scale
07/18/2012

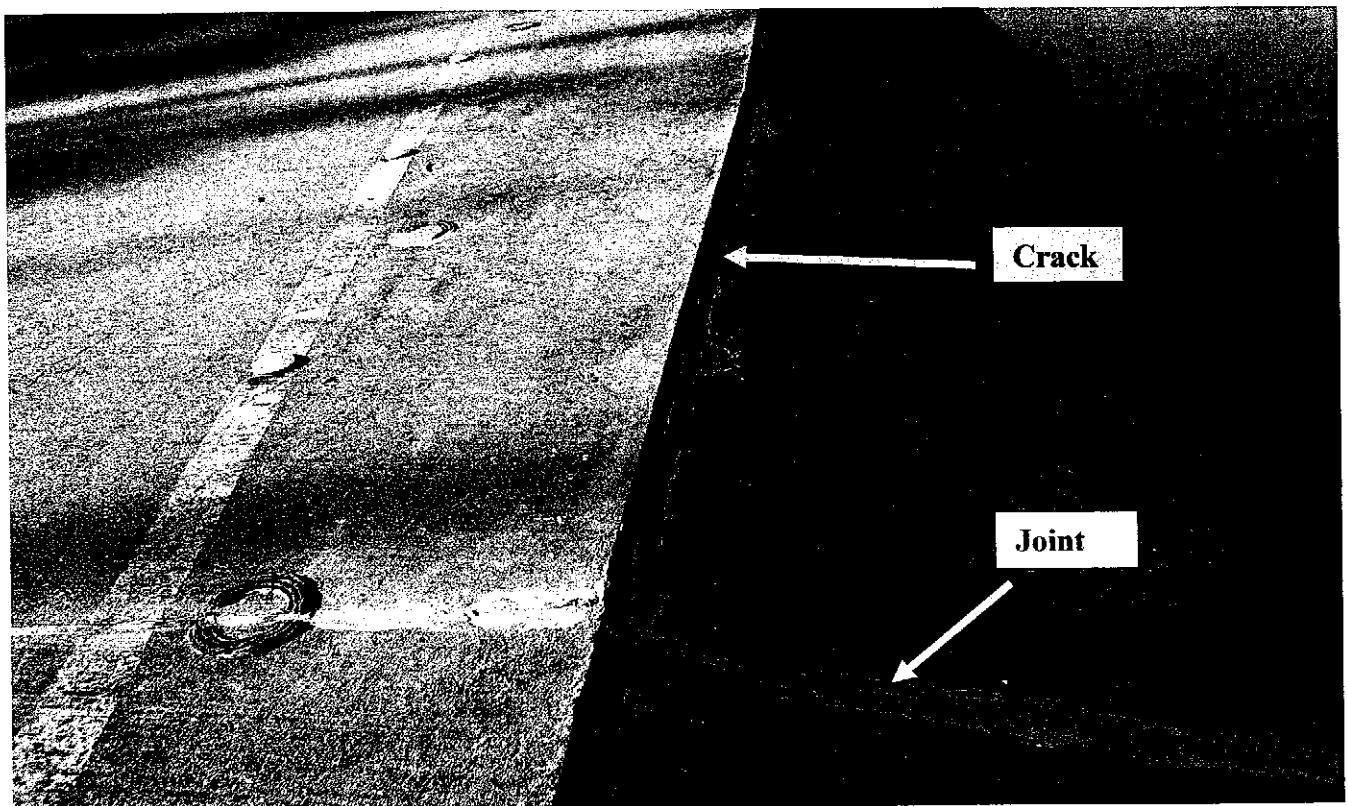


Photo 3. Upstream slope. View is looking south from the left end of the dam. An open joint was present between the dam crest and upstream slope along the entire length of the embankment. Additionally, the sealant in the joints between the concrete panels on the slope was deteriorated.



Photo 4. Upstream slope. View is of the open joint between the dam crest and upstream slope. The joint was a maximum of approximately 2.5 inches wide and 4.5 inches deep. Also a small crack with no displacement was present in the concrete panel.



Photo 7. Upstream slope. View is of cracks in the upstream slope's concrete cover



Photo 8. Upstream slope. View is of a joint between concrete panels on the upstream slope. The elastic sealant in the joint was deteriorated and vegetation was growing in the joint.



Photo 11. Downstream slope/Stilling basin. View is of one of several active sand boils located in the stilling basin near the right end of the downstream slope.



Photo 12. Downstream slope/Stilling basin. View is of two sand boils located in the stilling basin near the right end of the downstream slope

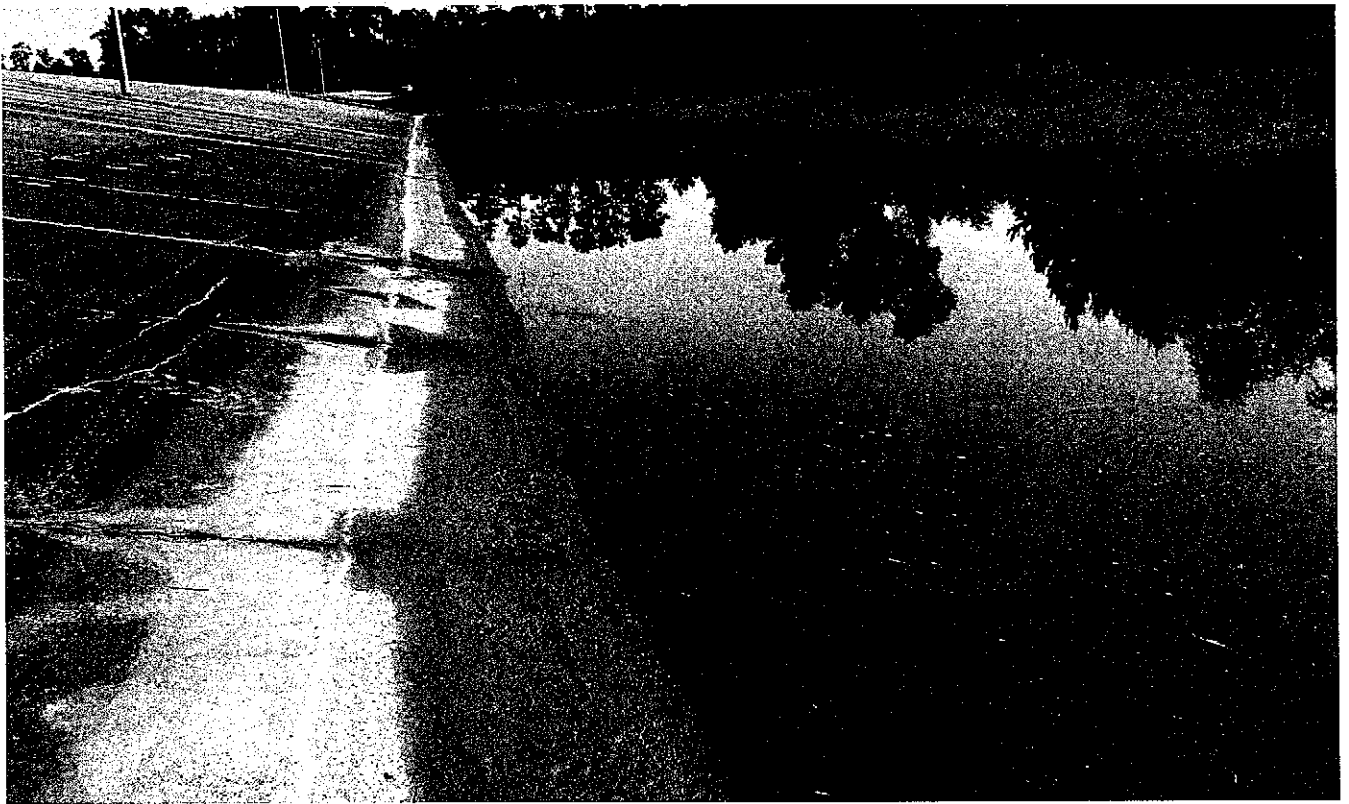


Photo 15. Downstream slope/Stilling basin. View is looking north from near the right end of the downstream slope. The slope was relatively uniform in grade. Seepage was present along some joints. The utility poles present on the upper portion of the slope were vertical and showed no signs of slope movement.



Photo 16. Downstream slope. View is of a sediment filled weep hole near the right end of the downstream slope.

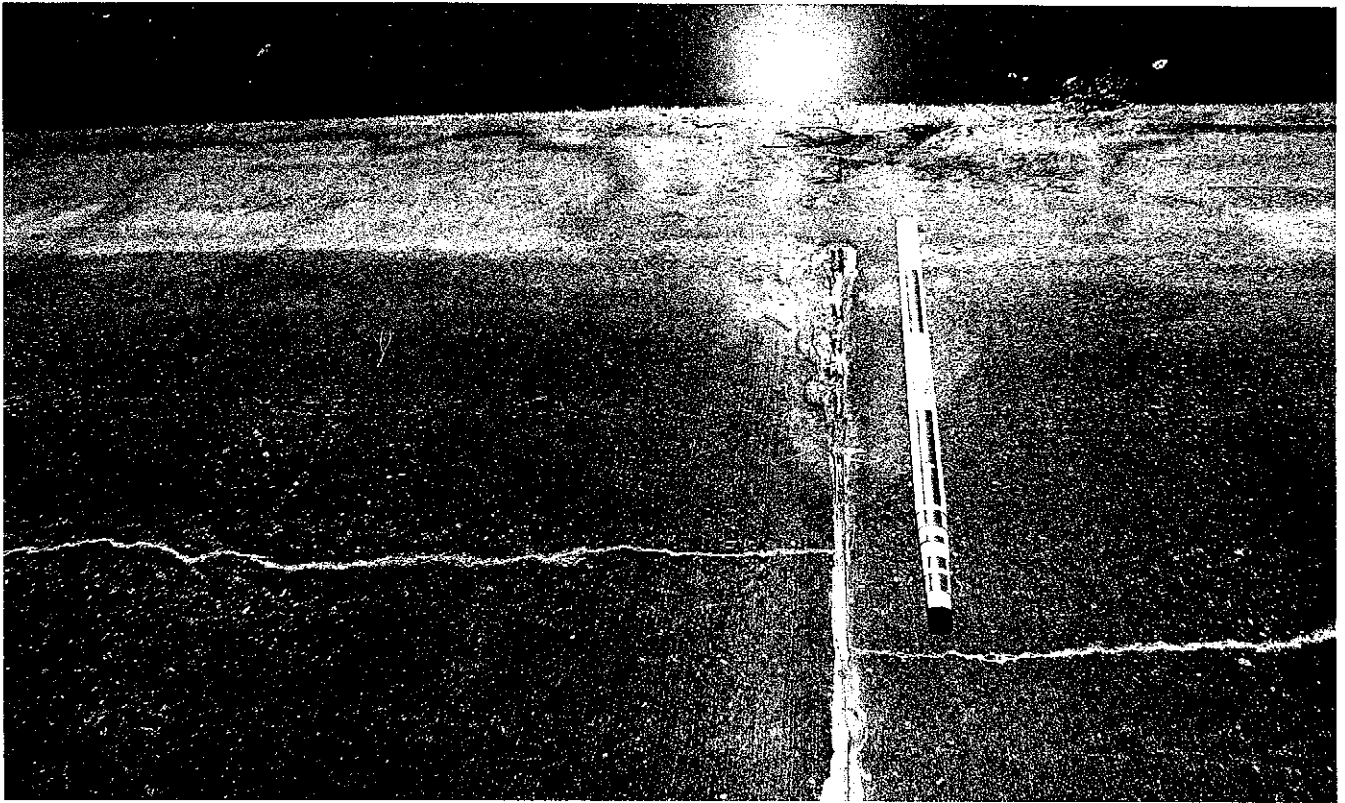


Photo 19. Downstream slope. View is of seepage from a joint on the downstream slope. Note that the seepage was emanating from a point several feet above the downstream toe of the embankment. Longitudinal cracks were present in the embankment's concrete cover.



Photo 20. Downstream slope/Stilling basin. View is of longitudinal cracks in the concrete cover and sediment and vegetation in the joints between concrete panels. Sediment was also present in the stilling basin.

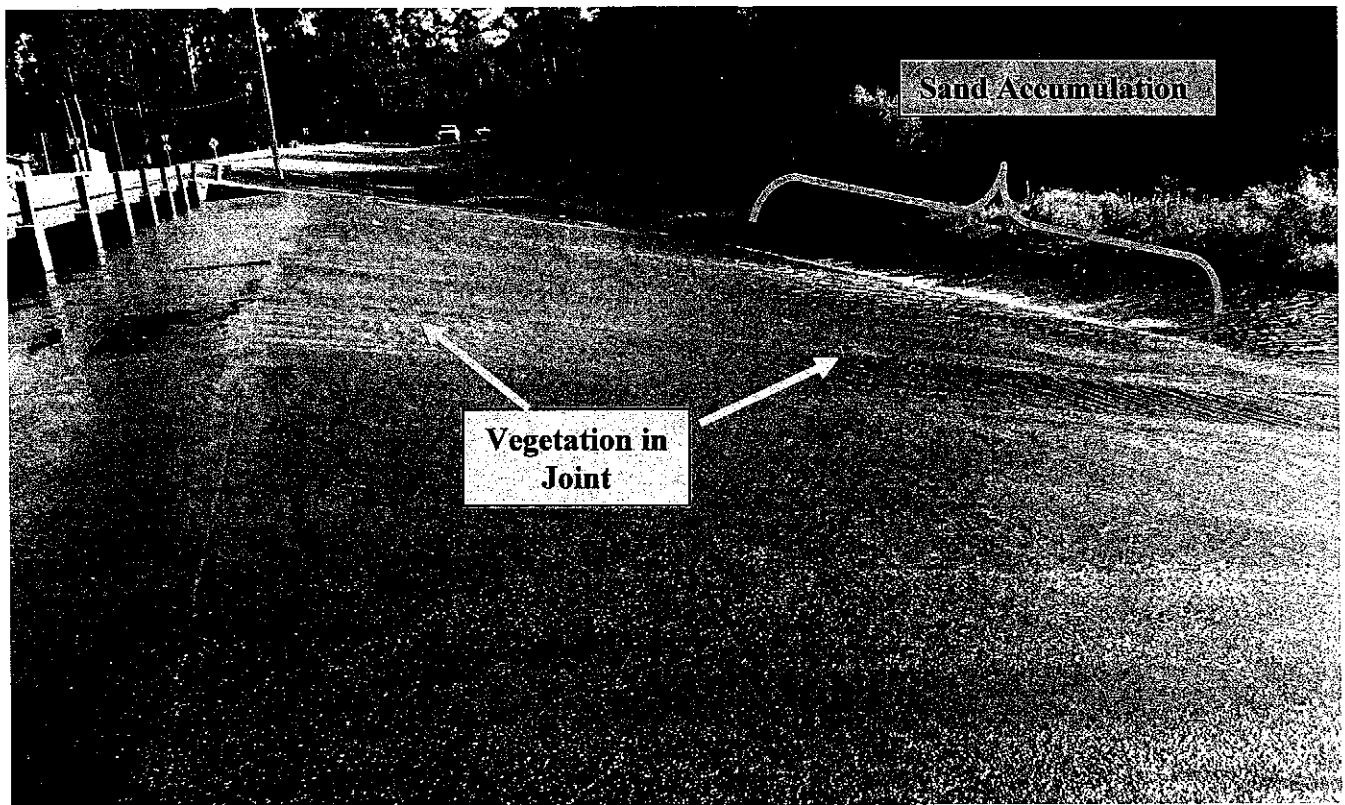


Photo 23. Principal spillway. View is looking north across the downstream side of the principal spillway. The spillway was engaged. Vegetation was growing in the joint where noted. Note the areas of accumulated sand along the downstream toe.



Photo 24. Principal Spillway. View is of a joint with vegetation on the spillway discharge area. Note the areas of accumulated sand along the downstream toe.



Photo 27. Principal Spillway. View is of cracked and spalled concrete at the base of a guardrail post secured to the bridge over the principal spillway. This photo is representative of the condition of many other guardrail posts on the bridge.



Photo 28. Principal Spillway. View is of a possible boil located beneath a loose metal plate near the downstream toe of the principal spillway discharge chute.

Lake Charmaine Dam

From: **Robert Harrison** (fish50@worldnet.att.net) This sender is in your contact list.

Sent: Thu 11/14/13 7:40 AM

To: C. D. Woodrome (davidwoodrome@hotmail.com); Cathy Bennett (revcathyb@hotmail.com); Clindsey@estiscompression.com; Chuck Vonderlin (cvonderlin@juno.com); Jack Brockhouse (cjdrb@aol.com); Joe McIntyre (bemo99@aol.com); Mollie Vieau (vieaumd@yahoo.com); Tom Welch (wtwelch3@gmail.com); Tommy Morris (tmorris8150@yahoo.com)

This note is written to make you aware of the present problem with Lake Charmaine Dam and actions to be taken to try to control the problem. On Sunday, November 10, two severe boils were observed at the base of spillway about a foot inside the stilling basin about 20 foot apart. At that time the stilling basin was about 1 foot deep and boils were rising above that level by about two to three inches. Lake Charmaine was overflowing thru the spillway as normal. Action was taken to open the valve on the dam to lower the lake level. On Monday morning the lake level had dropped below the spillway and the boils had stopped. At present, it is assumed that the boil action was due to water passing over the spillway, going through the joints between the concrete slabs, traveling under the slabs and down to base under the stilling basin and exiting as the boils.

The present plan of action is to control the Lake Charmaine level to prevent any further flow thru the spillway but not drop the lake so low that is unusable for normal activities on the lake. If heavy rains are predicted then further lowering of the lake may be required to prevent overflow. So, you may see the valve open at times and then see it closed. This action may continue for several weeks while solutions are developed and completed.

Rusty Harrison

Bryan W. Shaw, Ph.D., P.E., *Chairman*
Toby Baker, *Commissioner*
Zak Covar, *Commissioner*
Richard A. Hyde, P.E., *Executive Director*



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

February 24, 2014

Mr. Robert "Rusty" Harrison
Dam Supervisor
City of Ivanhoe
880 Charmaine Drive East, Suite A
Woodville, Texas 75979

Re: **Lake Charmaine Dam**
Inventory No. TX03755

Dear Mr. Harrison:


By letter of February 14, 2014, you provided an explanation of the present condition of the voids and boils in the spillway of Lake Charmaine Dam. The photos also give a good indication of the possible extent of the voids.

After reviewing your letter and the recommendation of your engineer, Wallace "Butch" Wilson, LJA Engineering, we are in agreement that drilling holes in the concrete to determine the full extent of the voids is appropriate. We recommend that work start as soon as you get a contract with one of the companies that are bidding on the project. We also recommend that your line of holes extend outside your marked area to confirm your area.

Please call me when you get the results of the drilling and void determination before you start placing the flowable fill.

If you have any questions, please feel free to contact me (512/239-5195).

Sincerely,


Warren D. Samuelson, P.E., Manager
Dam Safety Section
Critical Infrastructure Division, MC-177

WS/tj